Bank of Israel

Investment of the

Foreign Exchange Reserves

Annual Report 2020

Contents

Main Developments

The COVID-19 crisis

Due to the outbreak of the coronavirus pandemic, in 2020 there was a sharp slowdown in real activity and an increase in risks worldwide. In financial markets, this was reflected in steep declines in equity and corporate bond prices and in a sharp decline in yields on government bonds around the world, particularly in the US and Germany in the first quarter of the year. However, over the course of the rest of the year, risk assets increased in value and most ended 2020 with positive rates of return. During the year, a sharp increase in volatility was seen in all financial assets.

The Bank of Israel, as a long-term investor, maintained the share of investment in risk assets in the reserves portfolio while taking various steps intended to minimize the financial risks to which it is exposed through the investment in such assets. In addition, in view of a marked deterioration in economic conditions in the domestic economy due to the spread of the COVID-19 pandemic and the steps taken to halt it, the Bank of Israel used a range of tools to aid in handling the crisis. Among other things, the foreign exchange reserves were used for the first time and the Bank began to execute swap transactions in the foreign exchange market with the goal of supplying dollar liquidity to the domestic banks.

Level of the reserves

Israel's foreign exchange reserves were $173.3 billion at the end of 2020, an increase of $47.3 billion over the course of the year, compared with the preceding year. The level of the reserves relative to GDP increased from 31.9 percent to 43.3 percent.

Sources of the change in the reserves

The increase in the reserves derived from foreign exchange purchases totaling $21 billion by the Bank of Israel as part of the implementation of the monetary policy, from the government's deposits totaling $14.6 billion, and from profits, revenue, and exchange rate and price differentials (mark to market) totaling $11 billion.

Composition of assets in the reserves

At the end of 2020, 64 percent of the reserves were invested in government assets, 15 percent in equities, 14 percent in spread assets, and 7 percent in corporate bonds.

Financial conditions

From a full year perspective, financial markets were supportive of the portfolio's performance. The decline in yields to maturity on government bonds, in parallel with an increase in the prices of risk assets, equities, and corporate bonds, contributed to the return, while at the same time an increase in risk was reflected in a sharp increase in financial asset volatility.

Return on the portfolio

The rate of return on the reserves portfolio in 2020 was 4 percent in terms of the numeraire, which is a basket of currencies, primarily comprised of the dollar and euro. Over the past three years, the rate of return has averaged 3.4 percent per year, and over the past five years, it has averaged 3 percent per year (Table 1a).

Table 1a
Rate of return on the foreign exchange reserves portfolio, annual and multiyear perspectives, in terms of the numeraire, annual terms

	2020	3 years	5 years
Reserves Portfolio return	4.0	3.4	3.0
Benchmark return	0.6	1.1	0.7
Excess return	3.4	2.3	2.2

Contribution of active management

The contribution of active portfolio management, measured by comparing the portfolio return with the risk-free portfolio (the basic benchmark) return, was 3.4 percent in 2020. The main contribution

to this was from equities—1.8 percent, primarily through the investment in US equities—1.76 percent, as well as from duration—1.5 percent.

Risk level in the portfolio

The portfolio's volatility, which represents its risk level, rose to a record this year. Due to the high volatility in equity indices and due to their high share in the portfolio compared to previous years, the standard deviation of the portfolio's return, which measures such volatility, reached 3.35 percent in 2020, compared to a level of approximately 1 percent, on average, in the past decade.

Review of investment policy objectives

The marked increase in the level of the reserves, which derives from the Bank of Israel's foreign exchange purchases as part of the implementation of the monetary policy, led the Bank to examine the objectives on which the reserves investment policy is based and the policy's characteristics, such as the investment horizon, risk profile, share of investment in risk assets, as well as the currency for measuring the return on the reserves. Subject to achieving the safety and liquidity objectives, it is important that the investment policy of the reserves portfolio achieve a return in shekel terms that in the long term will at least cover the financing cost of holding the reserves (the cost of the liabilities on the Bank's balance sheet). In view of this, the holding rate of return on the reserves portfolio is reported in shekel terms as well (Table 1b).

In 2020, the return in shekel terms is negative, due to the appreciation of the shekel vis-à-vis the main currencies in which the reserves are held, particularly against the dollar. Despite the prolonged appreciation of the shekel vis-à-vis the investment currencies, the return is only slightly negative in the 1-year and 5-year terms, and is even positive in the 3-year term.

Table 1b
Rate of return on the foreign exchange reserves portfolio, annual and multiyear perspectives, in shekel terms, percent, annual and cumulative terms

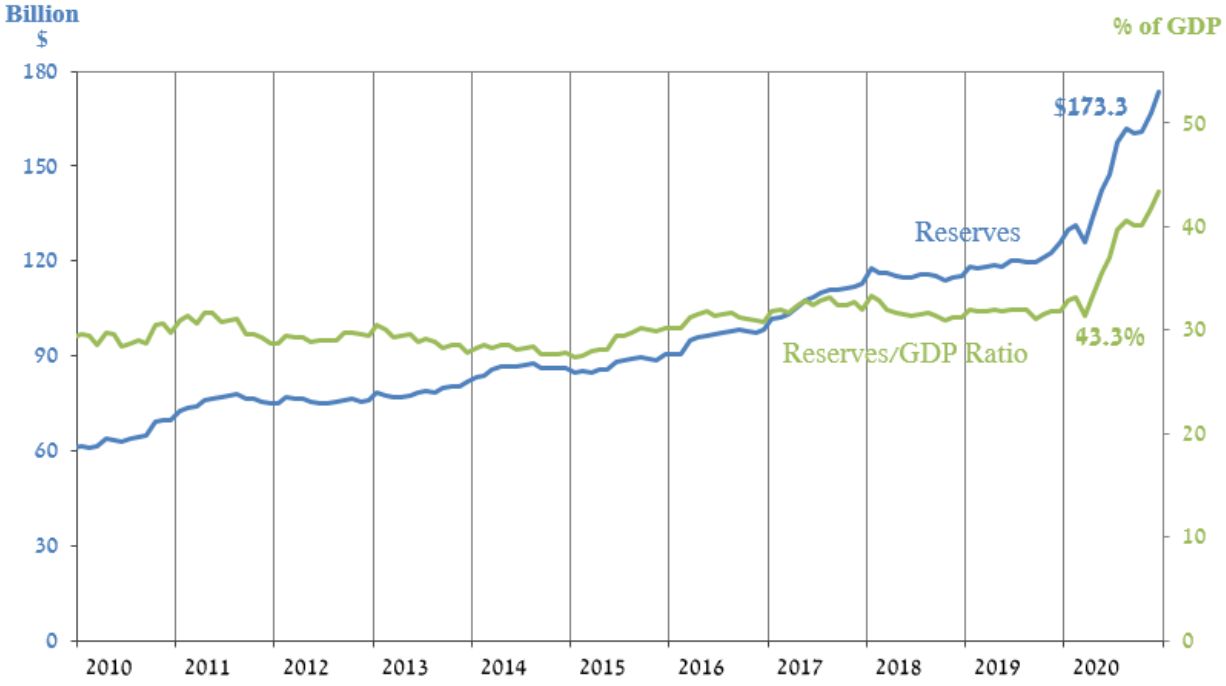
	2020	3 years	5 years
Reserves portfolio return – annual terms	-0.5	1.1	-0.3
Reserves portfolio return – cumulative	-0.5	3.4	-1.4
Numeraire/NIS rate of change – annual terms	-4.3	-2.2	-3.1
Numeraire/NIS rate of change – cumulative	-4.3	-6.5	-14.8
$/NIS rate of change	-7.0	-2.5	-3.8

A negative sign in the rate of change in the exchange rate means appreciation of the shekel.

A. The Level of the Foreign Exchange Reserves

In 2020, Israel's foreign exchange reserves grew by $47.3 billion, from $126 billion at end 2019 to $173.3 billion at end 2020 (Figure 1).[1]

Figure 1
Level of Israel's Foreign Exchange Reserves, and the Ratio of the Reserves to GDP, 2009–2020
(month-end balance)



Source: Bank of Israel

The increase in the reserves resulted from foreign currency purchases in the amount of $21.2 billion by the Bank of Israel, government deposits in the amount of $14.6 billion, and a mark-to-market of $11.1 billion (Table 2). The mark-to-market is the change in the dollar value of the reserves attributed to profits realized from interest income, capital gains, and the change in value due to asset price differentials and exchange rate differentials, against the dollar, of currencies in which the reserves are invested, as follows:

1. $4.5 billion from income from exchange rate differentials, mainly of the euro and the pound sterling, in which approximately 30% of the reserves are held, due to the strengthening of these currencies against the dollar;
2. $2.7 billion from income due to an increase in the value of equities and capital gains on bonds, deriving from declines in yield;
3. $3.9 billion from interest income and realized capital gains.

[1] The level of the reserves throughout the Report includes the International Monetary Fund's allocations of SDRs and the balance of Israel's reserve tranche in the IMF. At the end of 2020, their combined level was approximately $2.1 billion. For more on this issue, see "Bank of Israel Financial Statements for 2020."

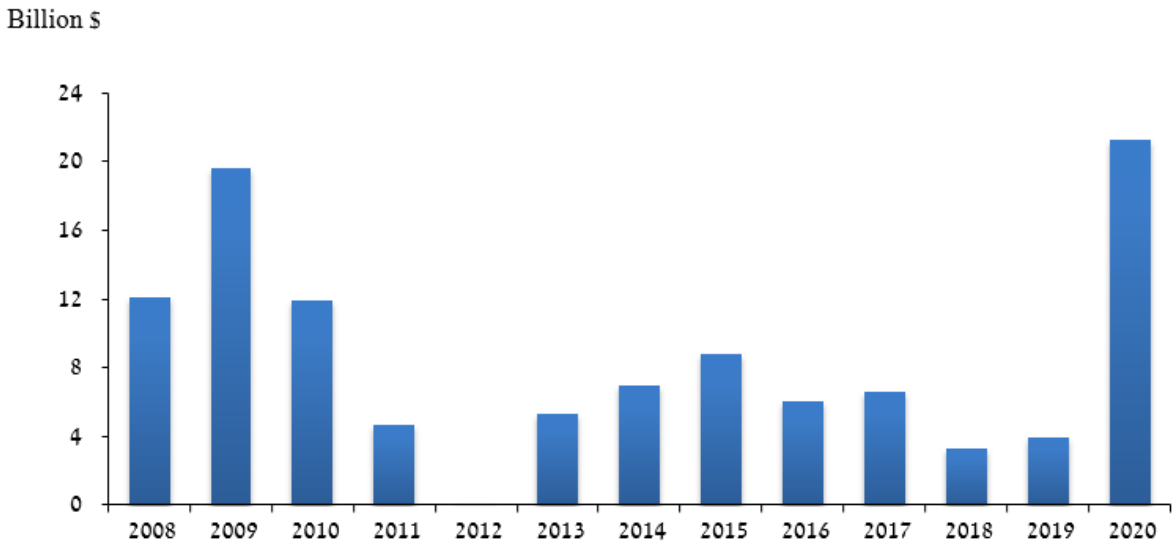
Table 2
Components of the Change in the Reserves, 2020
($ million)

FX Purchase	21,238
Mark To Market	11,080
Private Sector	331
Government	14,634
Total Change	**47,283**

Source: Bank Of Israel

In 2020, against the significant decline in economic conditions resulting from the spread of the Covid-19 virus pandemic and the steps taken to stop the spread, the Bank of Israel employed a range of measures to help to deal with the crisis. The primary actions taken were designed to ensure the continued operation of Israel's financial markets, increase the transmission from Bank of Israel interest rate to market interest rates, and relax credit terms. Among various steps, the Bank of Israel entered into dollar/shekel swap transactions on the foreign currency market in the amount of $7.5 billion to provide dollar-denominated liquidity for local banks. This measure was implemented through the first-time use of the foreign currency reserves that the Bank of Israel accrued in recent years. The high level of reserves made it possible to efficiently provide the required level of liquidity to the local financial market. Bank of Israel purchases were performed, as part of its monetary policy,[2] due to the weakening of the dollar against the shekel and these purchases were considerably larger in scope compared to previous years (Figure 2).

Figure 2
Bank of Israel Foreign Exchange Purchases, 2008–2020



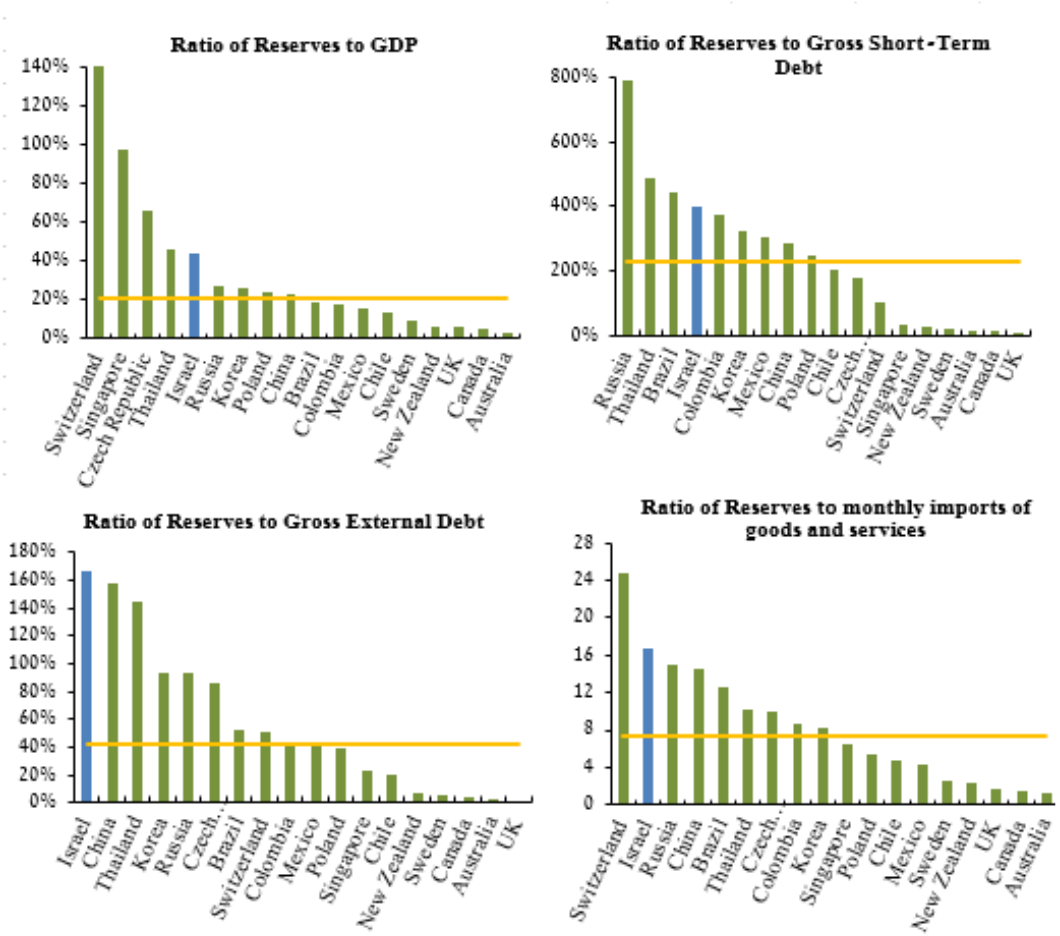
Source: Bank Of Israel

[2] See Box on "Exchange rate policy at the Bank of Israel: Reasons, outcomes and decision-making process" available at
http://www.boi.org.il/en/NewsAndPublications/RegularPublications/Pages/IMF201602h.aspx#

As a result, the level of the reserves relative to GDP increased considerably, from 31.9% to 43.3%. Furthermore, the level of reserves at end 2020 was considerably higher than the upper bound of the appropriate level[3] that had been set, in the range between $70 billion and $110 billion. In view of the Monetary Committee's statement[4] on a plan to purchase $30 billion in 2021, reserves are expected to rise in 2021 as well.

Reserves are commonly measured relative to the following economic aggregates: GDP, the economy's short-term debt, imports, and external debt. It can be seen that the ratio of reserves to economic aggregates for Israel is higher than the median of other countries, and increased significantly in 2020 compared to previous years (Figure 3).

Figure 3
The Ratio of the Reserves[1] to Economic Aggregates, Israel and Selected Countries



[1]Level of reserves as of 31.12.2020 and the economic aggregates as of 31.12.2019
Source: Centrel Bureau of Statistics, International Monetary Fund, World Bank

[3] The appropriate level of the reserves is determined by the Governor in accordance with the objectives of holding them, based on the principles established by the Monetary Committee. See Appendix 2 of the Investment of the Foreign Exchange Reserves report for 2017—Principles for determining the desired level of the foreign exchange reserves.

4

B. The Framework for Managing the Foreign Exchange Reserves

1. Objectives of holding the reserves and the guidelines for reserves management

According to the **Bank of Israel Law, 5770–2010**, one of the Bank's functions is to hold and manage the country's foreign exchange reserves. The Monetary Committee, which is headed by the Governor and whose members include representatives of the public, has the authority to establish **guidelines for the investment policy of the reserves** (Appendix 2), in consultation with the Minister of Finance, and to monitor the implementation of this policy.

The **investment guidelines** include the specification of the assets permitted for investment, the risk profile, and the quantitative and qualitative limitations on types of assets permitted for investment. It should be emphasized that these guidelines do not constitute a recommendation for the actual composition of investment in these assets. The actual proportions of investment are determined in the annual strategic allocation process and the deviations from the allocation that are made within the framework of degrees of freedom granted to the Markets Department by the Monetary Committee. The strategic allocation is determined subject to the level of risk set by the Committee, and is based on assessments of the expected conditions in the relevant financial markets (see Section 3 of this chapter for further discussion of the allocation process).

Countries hold foreign exchange reserves for three main purposes:

- To provide the economy with sufficient foreign currency for an emergency situation (such as war or natural disaster). In such events, it may be necessary to maintain imports or to increase imports rapidly and significantly in order to deal with the emergency, while exports are liable to be severely negatively impacted and thus reduce the inflow of foreign currency. In these circumstances, the government and the private sector will find it difficult to raise foreign currency abroad, and the foreign exchange reserves will become the country’s main source for financing in foreign currency.
- To enable the central bank to intervene in the foreign exchange market in the following circumstances: (1) the foreign exchange rate has deviated from the range that is consistent with the economy’s fundamental equilibrium; or (2) the foreign exchange market is not functioning efficiently (market failure).
- To enable the central bank to operate in the foreign exchange market in order to moderate the effect of significant capital flows of either nonresidents or domestic residents, which are liable to undermine the stability of the financial markets, thereby negatively impacting the stability of the economy as a whole (a specific case of the previous purpose).

In order to achieve these goals, the investment policy of the reserves is based on the following three basic principles:

- Maintaining the purchasing power of the reserves;
- Managing the reserves at a high level of liquidity;
- Achieving a suitable holding rate of return on the reserves portfolio, as long as this does not interfere with achieving the previous objectives (as detailed in Appendix 2—Foreign Exchange Reserves: Investment Policy Guidelines).

Due to the meaningful increase in reserves, which is a result of foreign currency purchases by the Bank of Israel as part of its monetary policy, and due to the assessment that this trend will continue, the Bank of Israel reviewed the goals of its reserve investment policy. Subject to achievement of safety and liquidity goals, it is important that the portfolio’s investment policy

generate a shekel-denominated return that, in the long term, will at least cover the financing cost of holding the reserves (the cost of liabilities in the Bank's balance sheet). This goal is achievable through adjustments to the investment horizon, the risk profile, and the weights of the risk assets in the reserves portfolio to the conditions of the changing environment.

2. The risk level of the reserves

The maximum level of risk of the reserves portfolio (the risk profile) is determined by the Monetary Committee based on its assessment of the risk that is appropriate for the reserves holding objectives, and is defined as the maximum loss in the reserves that the Committee is willing to accept, without adversely affecting the attainment of the objectives for which they are held. The risk profile is determined in order to limit in advance the reserves' exposure to the various financial risks—price risk, credit risk, currency risk, and liquidity risk.

The risk measure $CVaR_p$ (Conditional Value at Risk) is used to quantify the market risk (price risk and currency risk). It measures the risk in terms of the expected loss on the investment portfolio in a specific time period, for a given probability (p). It should be noted that CVaRp is a forward-looking (ex-ante) indicator, affected by changes in the portfolio holdings and the volatility of the portfolio assets, but is based on the past levels of volatility.

In the guidelines, the Monetary Committee set the maximum level of risk for the reserves, so that given the worst 5 percent of possible outcomes, the average loss—the CVaR5%—would not be greater than 475 basis points over a one-year horizon. This risk level was set with the goal of limiting the short-term risk and increasing the probability of maintaining the purchasing power of the reserves in the intermediate term. The Monetary Committee regularly evaluates the conditions under which the level of risk was set, and may change this level if material changes in these conditions occur.

At the beginning of every year, the Monetary Committee sets the level of risk (in terms of $CVaR_{5\%}$) used to determine the strategic allocation for that year, based on the expected macroeconomic and financial background conditions. For 2020, the Committee chose a level of risk of 320 basis points. In fact, due to the considerable increase in the volatility of the financial assets during the year, as a result of the Covid-19 virus crisis, the level of risk of the portfolio rose above 320 basis points in the course of the year but did not exceed the maximum risk level established in the guidelines.

3. The basic benchmark, the strategic allocation, and the actual composition

The management of the Bank of Israel's foreign exchange reserves portfolio, like that of other investors worldwide, uses a **benchmark** as a reference point for measuring returns of investment decisions and risks taken by portfolio managers. A benchmark is a hypothetical portfolio composed of various investable assets on the basis of known and fixed rules.

The **basic benchmark** represents a conservative, minimum-risk composition of investable assets, which meets the first two goals of the investment policy for the reserves—maintaining their purchasing power and managing them at a high level of liquidity. In order to achieve its objectives, the basic benchmark is composed of selected short-duration (6-months), high-rated government bonds with a high degree of liquidity and the same currency composition as the numeraire.

The **numeraire** is a basket of currencies consisting of 3 currencies that, over the year, on average comprised 67.8 percent (US dollar), 29.7 percent (euro), and 2.5 percent (pound sterling). The numeraire's composition is derived from the potential uses of the reserves when needed and from the principles reflected by the objectives of holding them. The holding rate of return on the foreign exchange reserves is measured in terms of the numeraire and therefore its composition is considered risk free from the perspective of the reserves portfolio manager. The numeraire's composition is reviewed at least once a year and is revised when necessary, subject to the approval of the Monetary Committee. The numeraire is defined quantitatively (a quantity-based currency basket) so that its currency composition changes with the daily changes in the exchange rate of its constituting currencies.

The annual strategic allocation process determines the composition of the reserves portfolio for the coming year. The strategic composition of the reserves portfolio is determined so that the expected return on the portfolio is adequate, subject to the desired risk level and the guidelines. The strategic allocation determines the main features of the reserves portfolio, including the currency composition, the asset composition, and the target duration for each currency benchmark.

In the context of the strategic allocation for 2020, the Committee decided to maintain the investment in equities at 15 percent, as in the previous year; to reduce the investment in corporate bonds[5] from 8 percent to 6 percent, with a currency distribution of two-thirds in dollar-denominated corporate bonds and one-third in euro-denominated corporate bonds; to maintain the duration of the dollar portfolio at 2 years; to increase the number of currencies in the currency basket to six currencies (equally weighted investments in the Czech Republic, Norway, Chile, China, Poland and the US, against the euro), and; to increase investments in the currency basket from 1.2 percent to 3 percent (see Table 3).

Table 3
Strategic Allocation for 2019 and 2020

	2019	2020
Bonds	**77.0%**	**79.0%**
Duration (Years)	**2.0**	**2.1**
USD	2.3	2.3
EURO	1.5	1.5
GBP	1.5	1.5
Currency exposures	**1.2%**	**3.0%**
Equity	**15.0%**	**15.0%**
US	9.2%	8.8%
France	1.0%	1.4%
Germany	0.9%	1.3%
Japan	1.4%	1.2%
UK	0.9%	0.8%
Canada	0.5%	0.5%
Switzerland	0.4%	0.4%
Hong Kong	0.3%	0.3%
Australia	0.4%	0.3%
Corporate Bonds	**8.0%**	**6.0%**
US	5.3%	4.0%
Europe	2.7%	2.0%

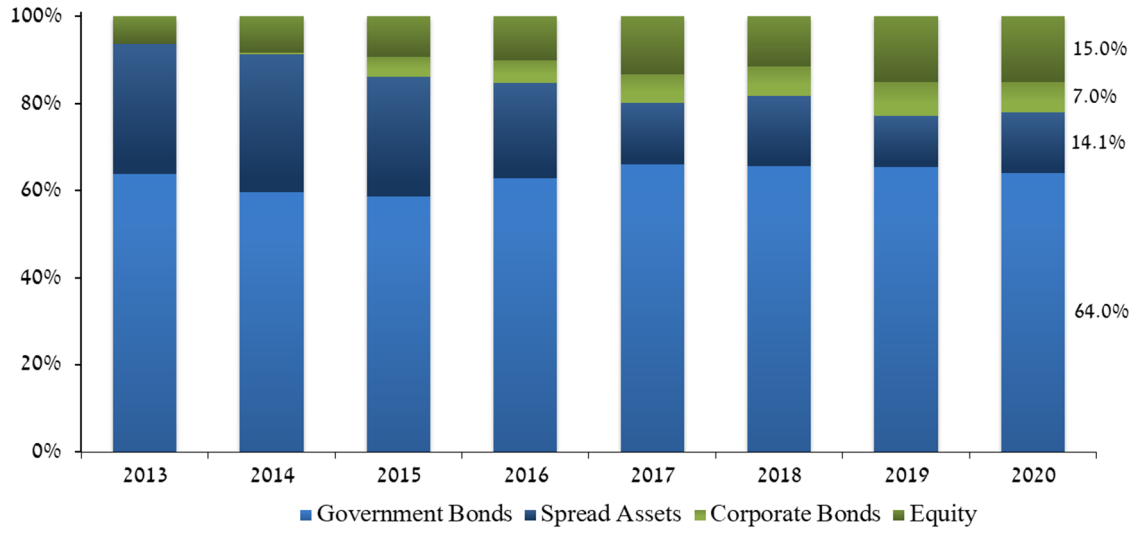
[5] In accordance with the Bank's investment policy guidelines that were in place in 2020, the Bank of Israel's investment in corporate bonds is solely in investment grade securities.

It should be noted that **the Monetary Committee allows the Markets Department some degrees of freedom for investment of the reserves**, so that the actual composition is likely to differ to some extent from that determined in the framework of the allocation. The difference may be reflected in an investment with different weights of the risk assets, or with a different duration than in the allocation, an investment in government bonds of countries that are not included in the basic benchmark, or an investment in spread assets—debt instruments of multinational and public-sector issuers— and in investment in government bonds denominated in a different currency than the local currency of the issuing country. In all cases the investment must meets the guidelines that define the permitted assets and issuers for investment, their minimum credit rating, and the limits on the proportion of the reserves invested in these assets and issuers (Appendix 2).

At end 2020, 64 percent of the reserves were invested in government assets,[6] of which 3 percent in the currency basket, 14 percent in spread assets, 7 percent in corporate bonds, and 15 percent in equities (Figure 4).

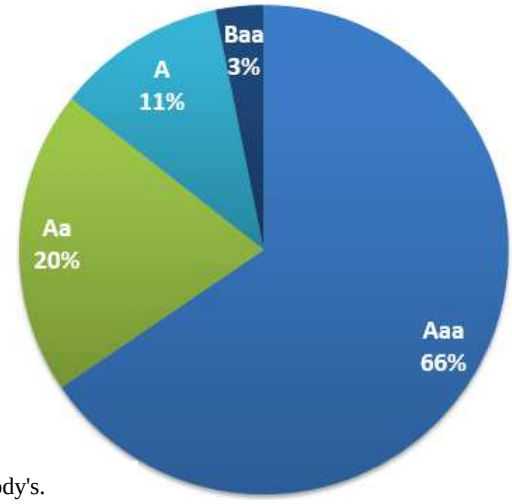
Also at end 2020, excluding the equity assets in the reserves portfolio, 66 percent of the reserves portfolio was invested in Aaa-rated bonds, 20 percent in Aa-rated bonds, 11 percent in A-rated bonds, and only 3 percent in Baa-rated bonds (Figure 5).

Figure 4
The Distribution of the Reserves Portfolio by Assets, 2013–2020
(period-end)



[6] Including deposits and current accounts in central banks that are subject to the same risks as government bonds.

Figure 5
The Distribution of the Reserves Portfolio (excluding equities) by Credit Rating, 2020
(period-end)



SOURCE: Bank of Israel and Moody's.

C. The Holding Rate of Return on the Reserves

1. Economic and financial background conditions

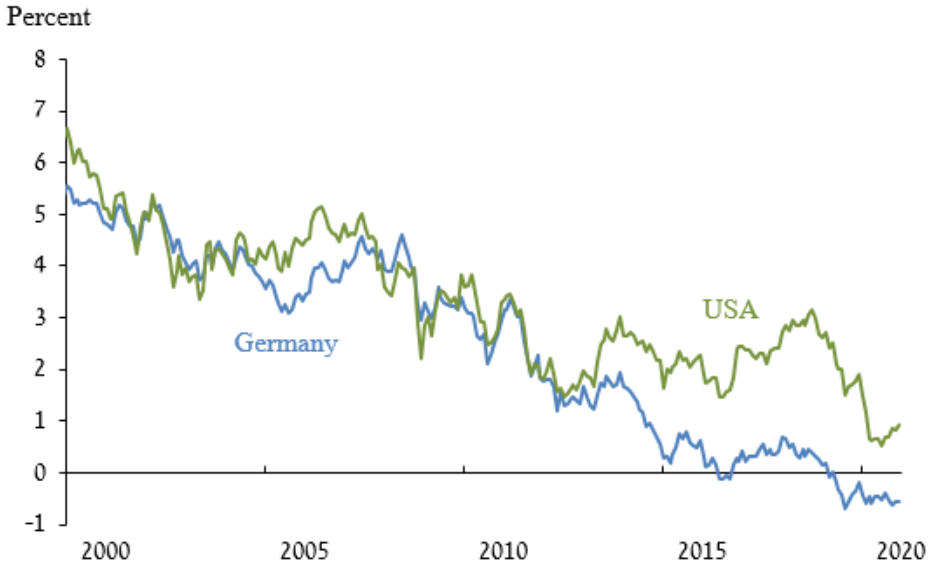
The beginning of the year was characterized by optimism and a positive momentum in the global economy, against a background of positive developments in the trade war. The outbreak of the Covid-19 virus in China, which became a global pandemic at the end of the first quarter of the year, constituted a sharp turning point and triggered unprecedented slowdown in economic activity. The social distancing restrictions imposed by many countries in efforts to halt the spread of the pandemic stalled economy activity and led to a deep recession. According to recent estimates, global GDP shrunk by 3.5 percent in 2020,[7] affecting all major economies with the exception of China.

The enormous economic damage led governments to use unprecedented measures to support economic activity, which led to a significant rise in budgetary deficits and a sharp rise in debt-to-GDP ratios, which reached their highest level since WWII.

At the same time, governments also took dramatic steps related to monetary policy. The major central banks announced monetary measures that included, among other things, quantitative easing and interest rate reductions. These steps led to a sharp drop in bond yields (Figure 6) and a reduction in corporate bond spreads.

Appendix 1 presents a more detailed analysis of the economic and financial environment in 2020.

Figure 6
Ten-year Government Bond Yields—US and Germany, 2000-2020



Source: Bloomberg

Faced with zero yields on government bonds, investors' risk appetite changed and consequently, despite the sharp declines in equity markets at the beginning of the Covid-19 crisis, most equity indices in which the reserves were invested ended the year with gains, with performance levels varying significantly across markets. Furthermore, 2020 showed a positive holding rate of return for most of the remaining types of assets in the reserves portfolio, with the exception of European

[7] Growth figures are based on the World Economic Outlook Update, January 2021, by the IMF.

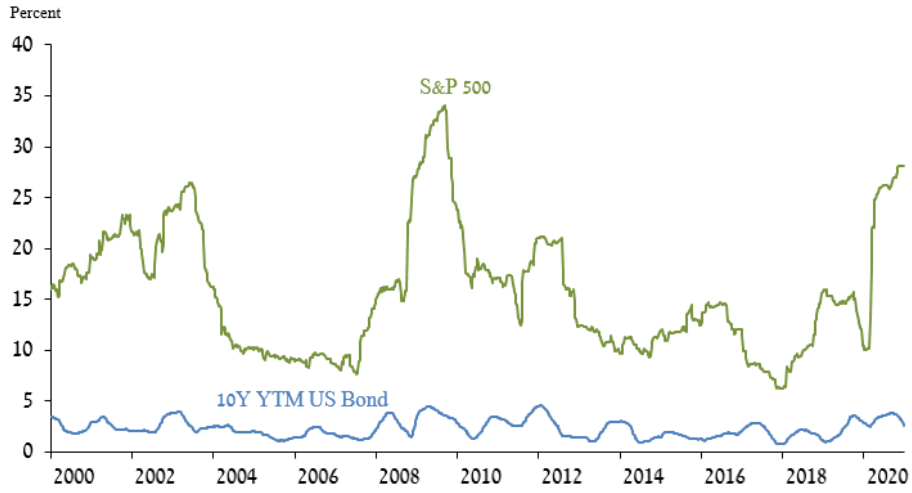
government bonds (Figure 7 presents yields to maturity by country, in local currency). Volatility of equities (measured by the standard deviation) rose sharply and approached the degree of volatility observed in the 2008 financial crisis (Figure 8).

Figure 7
Holding Rates of Return[1] and Standard Deviation for Main Indices of the Assets in the Reserves Portfolio, 2020

		Return in Local Currency	Standard Deviation in Annual Terms
Equity	MSCI US IMI Index	21.1%	31.9%
	MSCI Switzerland Index	3.8%	23.3%
	MSCI France IMI Index	-4.1%	34.1%
	MSCI German IMI Index	4.2%	33.2%
	MSCI Australia IMI Index	1.6%	29.6%
	MSCI Canada IMI Index	5.9%	31.0%
	MSCI Japan Index	7.8%	26.5%
	MSCI UK Index	-11.7%	29.2%
	MSCI Hong Kong IMI Index	6.0%	26.2%
Euro Bond	EUR Govt 0-1Y	-0.4%	0.1%
	Dutch Gov 1-5Y	-0.1%	1.1%
	France Gov 1-5Y	0.0%	1.1%
	Germany Gov 1-5Y	-0.3%	1.2%
	EUR Govt 1-5Y	1.1%	3.7%
	U.K. Gilts 1-5Y	1.9%	1.2%
US Bond	US 0-1Y	0.7%	0.2%
	U.S. Treasury 1-10Y	5.7%	2.7%
	US TIPS 1-10Y	8.5%	5.7%
	US Corporate 1-5Y	4.8%	5.4%

[1]Including interest, dividends and capital gains/losses
Source: Bank of Israel and Bloomberg

Figure 8
Standard Deviation[1] of the S&P 500 Index and the 10-Year US Treasury Notes, 2000-2020

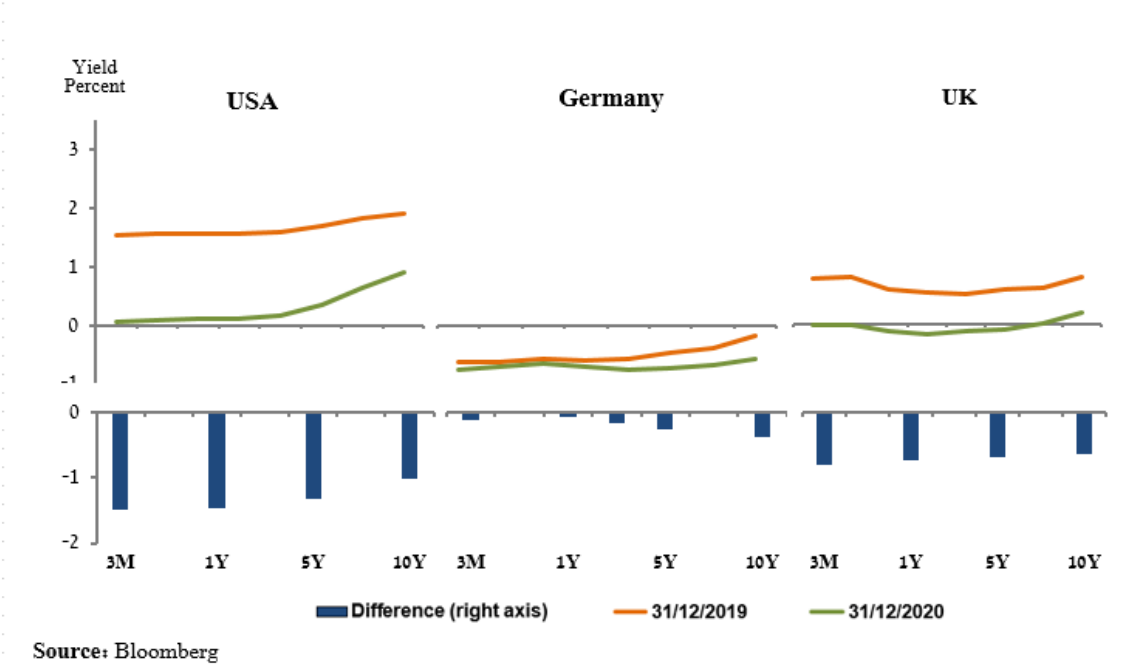


[1] Weekly standard deviation of the return on the S&P500 and of the yield to maturity on 10-year US Treasury Notes, in annual terms, 1-year moving average.

SOURCE: Bank of Israel and Bloomberg.

Monetary measures by central banks led, as stated above, to a sharp decline in bond yields. Yields to maturity dropped significantly along the entire curve in the US (by 100–150 basis points) and in the UK (around 70 basis points), which generated capital gains and increased the return on the reserves portfolio. In Europe, the yield curve flattened further, and all bonds traded in the negative range, below -0.5 percent (Figure 9).

Figure 9
Yield Curves and Changes in them—Government Bonds of US, Germany, and UK, 2020



Source: Bloomberg

As a long-term investor, the Bank of Israel maintained the strategic allocation of risk assets in the reserves portfolio unchanged, but over the year applied various measures to minimize the financial risks to which the Bank is subject through its investments in these assets. These measures included a reduction in the weight of equities to no more than 2.5 percent with the aim of minimizing the portfolio's risk, in view of the uncertainty in the markets at the time. Additional measures were taken to reduce the credit risk in corporate bond portfolios.

2. Return on the reserves portfolio

The holding rate of return on the reserves portfolio in 2020 was 4 percent in numeraire terms, and the return on the basic benchmark was 0.6 percent. The return on the reserves was the second highest in the past decade despite the Covid-19 crisis (Table 4). The active management return in 2020 was 3.4 percent, also the second highest return in the past decade. This was achieved due to the increase in prices of the risk assets—equities and corporate bonds—and due to a sharp decline in yields to maturity of dollar bonds in which the vast majority of the reserves is invested (Figure 7). The portfolio's volatility, which is measured by the weekly standard deviation, rose to a record high of 3.35 percent due to the significant volatility in the equity indices and their significant weight in the portfolio, compared to previous year.

Table 4

Reserves Portfolio Performance vs. the Basic Benchmark, 2010–2020

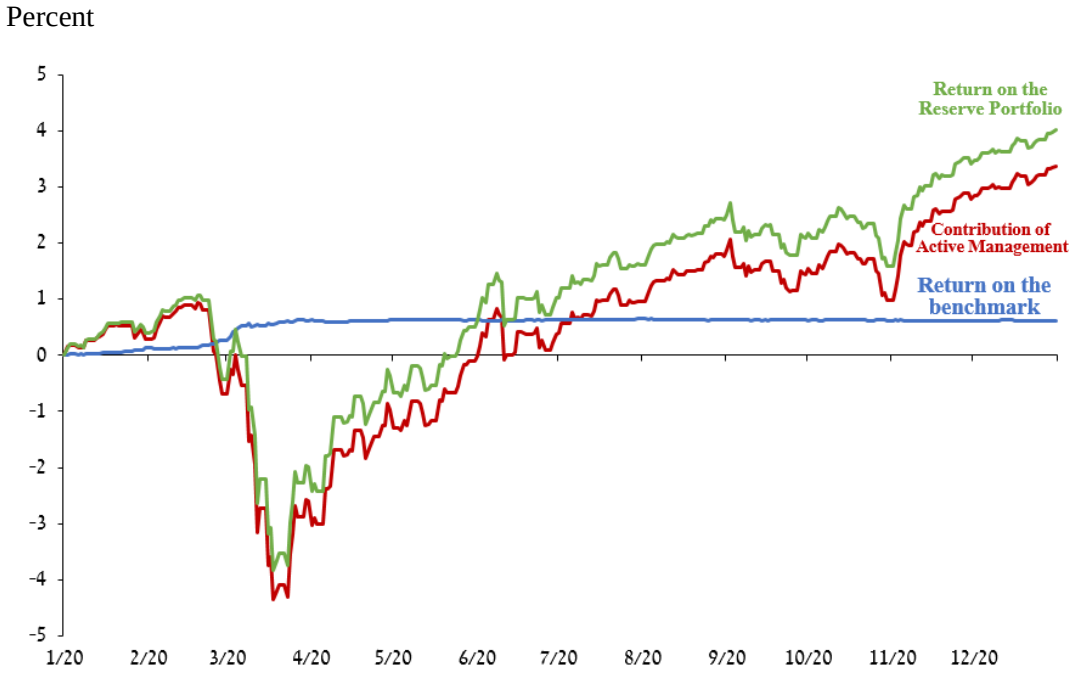
(Percent, in annual numeraire terms, the number on parentheses is the weekly standard deviation in annual terms

	Performance		Excess Return
	(1)	(2)	(1)-(2)
	Actual Portfolio	Basic Benchmark	Total
2011	**1.28**	**1.07**	**0.21**
	(0.80)	(0.39)	(0.71)
2012	**1.59**	**0.42**	**1.17**
	(0.57)	(0.17)	(0.52)
2013	**0.87**	**0.07**	**0.80**
	(0.80)	(0.16)	(0.74)
2014	**1.28**	**0.22**	**1.06**
	(0.85)	(0.09)	(0.88)
2015	**0.64**	**0.10**	**0.54**
	(1.29)	(0.12)	(1.29)
2016	**1.56**	**0.21**	**1.35**
	(1.33)	(0.13)	(1.33)
2017	**3.03**	**0.30**	**2.73**
	(0.80)	(0.10)	(0.77)
2018	**0.18**	**1.06**	**-0.87**
	(1.67)	(0.16)	(1.69)
2019	**6.12**	**1.54**	**4.59**
	(1.42)	(0.19)	(1.45)
2020	**4.01**	**0.61**	**3.40**
	(3.35)	(0.25)	(3.44)

Source: Bank of Israel

Although the year ended with a positive return on the reserves portfolio, returns fluctuated over the year and even reached a negative return of app. 3.8 percent at the height of the Covid-19 crisis (Figure 10).

Figure 10
Holding Rate of Return throughout 2020



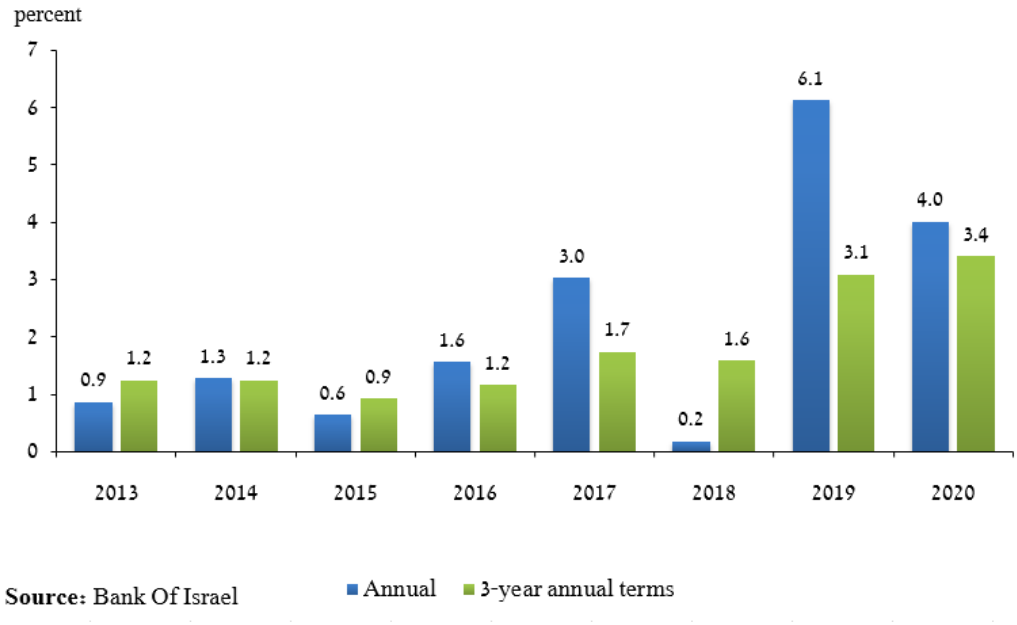
Source: Bank of Israel

The Covid-19 crisis illustrates the importance of looking at the reserve portfolio's return from a multiyear perspective, which shows a positive multiyear average return on investments in risk assets despite the risk of short-term losses, such as those that occurred during the height of the crisis.

The 3-year average holding rate of return on the reserves portfolio increased this year to 3.4 percent in numeraire terms (Figure 11).

The higher the level of the reserves, the smaller the relative share of the reserves required to be available for immediate use in case of an emergency, and therefore part of the reserves can and should be invested with a longer term investment horizon, essentially by increasing the investment in risk assets. The average multiyear return on risk assets, in which an increasing proportion of the reserves portfolio has been invested in recent years, is expected to be positive. Nonetheless, risk assets are inherently volatile, and losses should be expected in certain years, especially during a crisis. **Three-year measurement shows clearly that the reserves portfolio's return is positive over time and is less volatile compared to annual measurement** (Figure 11).

Figure 11
The Reserves Portfolio Return, Annual and 3-Year Period, 2013-2020
(annual, numeraire terms)



Source: Bank Of Israel

D. Active Management Contribution — Excess Return over the Basic Benchmark

The contribution of active management is mainly the contribution of the decisions to invest in additional countries and in assets not included in the basic benchmark, or with a different weight, duration and composition compared to the basic benchmark.

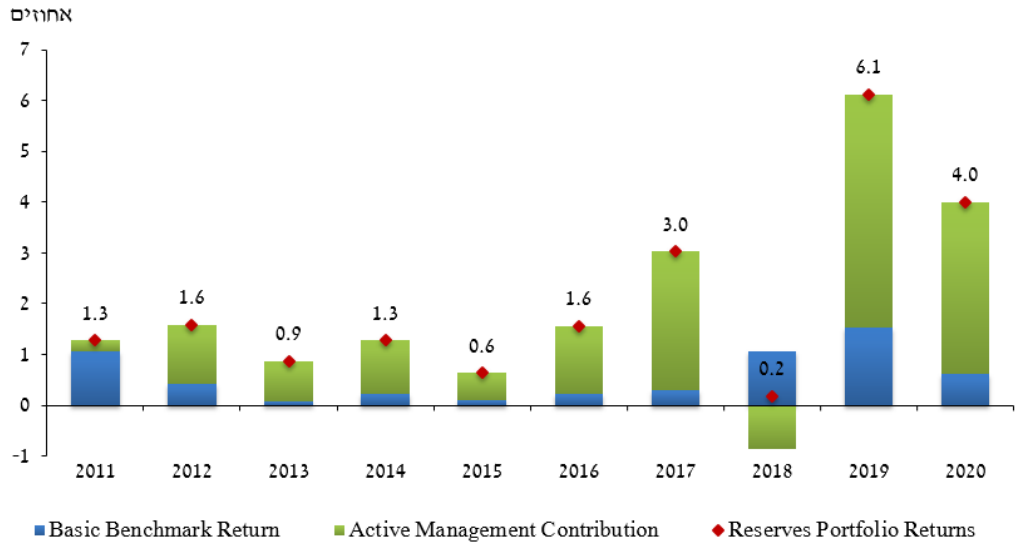
Active management decisions may be made with respect to the following types of risk: duration, equities, spread assets, corporate bonds, currency exposures and other risks.

Since 2012, the active management contribution, which is the excess return over the basic benchmark, has had the greatest effect on the return on the reserves portfolio, while the return on the basic benchmark has been relatively low and stable. Due to the **risk premium—** the return on risk assets in excess of the risk-free interest rate—increasing the risk components in the portfolio increases the long-term expected return. At the same time, volatility, which is also influenced by the correlation between the assets in the portfolio, is also expected to increase.

This year, active management increased the reserves portfolio's return by 3.4 percent, the second highest contribution in the past decade, following the contribution of 4.6 percent in the preceding year (Figure 12). Investment of the reserves in risk assets was initiated in 2012 through investment in equities, and continued through investments in corporate bonds, which commenced at the end of 2014. Over recent years, there has been a gradual increase of risk assets in the portfolio, reaching a peak in 2019 (Figure 4). The return in recent years reflects clearly the impact of the increasing investment in risk assets in the reserves portfolio, which increased the intermediate-term return at the cost of increased short-term volatility.

Figure 12

The Reserves Portfolio Return, the Basic Benchmark Return, and the Active Management Contribution, 2011–2020
(Numeraire terms)



Source: Bank Of Israel

Table 5
Breakdown of Active Management contribution to its components, 2018-2020
(Basis points, in numeraire terms, annual)

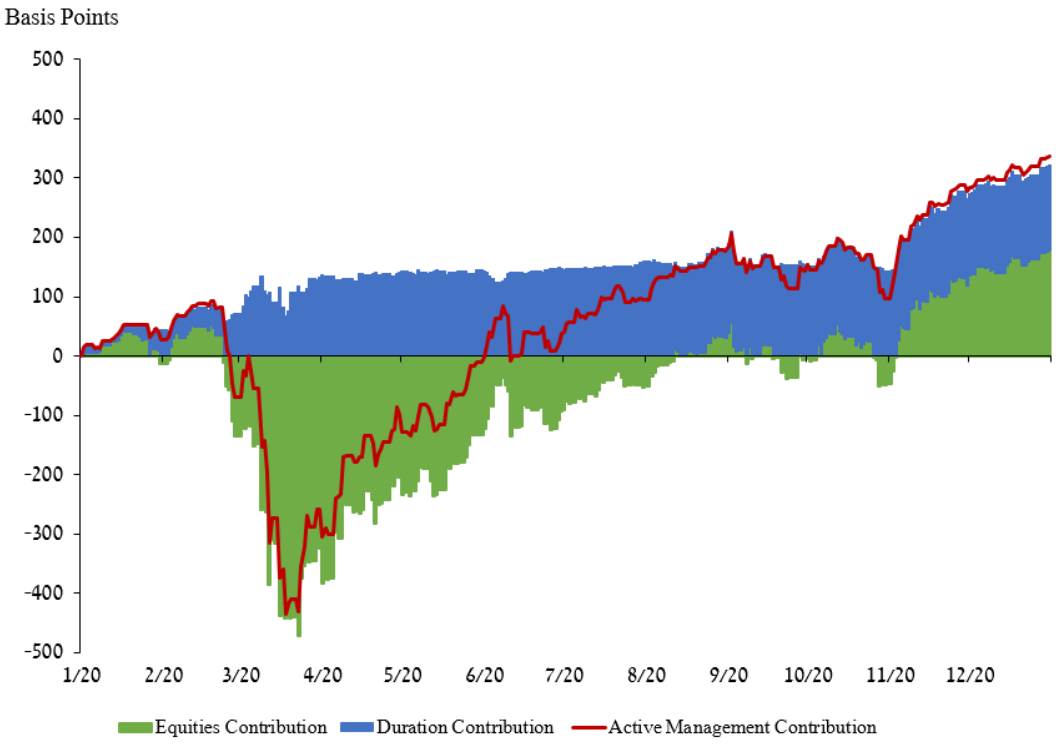
	2018	2019	2020
Equity	-110	340	181
Corporate Bonds	-7	17	14
Duration & Diversification	15	92	152
Spread assets	12	11	4
Currency and asset exposures	2	-1	-11
Total	**-87**	**459**	**340**

Source: Bank Of Israel

The two elements that made the greatest contribution this year were equities, whose contribution totaled 181 basis points despite the steep declines in the first quarter of the year, and duration, which contributed 152 basis points, mostly due to the sharp drop in yields in the first quarter of the year (Table 5).

The negative correlation between risk components, duration, and equities, which occurs mainly in crisis events, and which reduces investment risks, was clearly observed in March at the height of the Covid-19 crisis (Figure 13). After yields declined, however, the portfolio duration cushion, which absorbs losses during a crisis, was eroded by the low yield levels.

Figure 13
Active Management Contribution throughout 2020



Source: Bank of Israel

1. Equities (181 basis points)

The investment of the reserves in equities began in 2012, and it tracks local equity indices in investment markets. The investment is diversified by broad equity indices of advanced economies, based on the MSCI Developed Markets index. Investments in equities in markets that are not denominated in numeraire currencies are hedged against one of the numeraire currencies, in order to prevent currency exposures to the currencies of those markets.

The contribution of investment in equities was 181 basis points this year, the most significant of all the risk components (Table 5). The positive contribution was recorded after the majority of the equity markets in which the reserves are invested rose in annual terms (Figure 7), after the sharp declines in March. High volatility was recorded over the year due to the Covid-19 crisis, and was the highest observed since the Bank began investing in equities.

The largest positive contribution of 176 basis points was recorded in the US, whereas the UK notably accounted for a negative contribution of 11 basis points. In general, performance levels varied significantly across the markets. The contribution of investments in equities in each country is the outcome of the size of the investment in that market and the change in the equity index in that market. As of the end of 2020, the major proportion of the investment in equities was in US equities (9 percent), which, together with the high increase of 21 percent in that index, contributed 176 basis points (Table 6), accounting for close to the entire contribution of the investment in equities.

Table 6
Shares of equities out of total reserves, by country and the contribution to the reserves portfolio in 2020

	Holding Percentage		Index Return 2020 (%)	Equity Contribution (b.p)
	End of 2019	End of 2020		
US	9.0	8.9	21.1	176
Germany	1.0	1.5	4.2	8
France	1.1	1.4	-4.1	-4
Japan	1.4	1.3	7.8	11
UK	0.9	0.5	-11.7	-11
Canada	0.6	0.4	5.9	1
Switzerland	0.5	0.4	3.8	0
Australia	0.4	0.3	1.6	0
Hong-Kong	0.3	0.2	6.0	0
Total	**15.1**	**15.0**	**15.5**	**181**

Source: Bank Of Israel

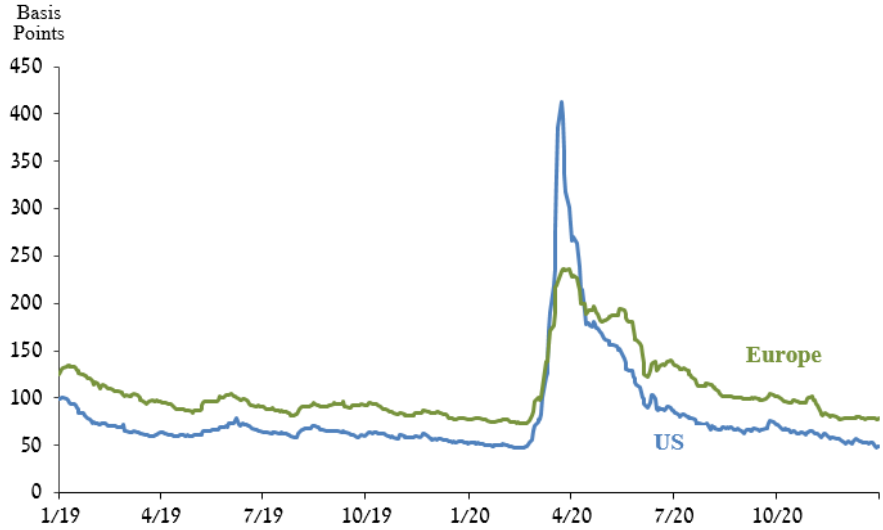
2. Corporate bonds (14 basis points)

The exposure to corporate bonds contributed 14 basis points. The main spread risk in the reserves portfolio results from the investment in investment-grade corporate bonds traded on the US and European markets. The investment is executed by internal and external investment managers, using a well-known benchmark with broad coverage of the dollar-denominated corporate bonds traded in the US and of the euro-denominated corporate bonds traded in European markets. In light of narrowing spreads in 2019, the Monetary Committee reduced corporate bonds' allocation to 6 percent of the benchmark in early 2020. In effect, the average share of the investment in corporate bonds in 2020 was 7.2 percent, compared to 7.1 percent in 2019, within the permitted degrees of freedom.

At the height of the crisis, at end March, spreads between corporate and government bonds increased by 360 basis points for dollar-denominated bonds and 160 basis points for euro-denominated bonds, but by the end of the year the spreads returned to their pre-Covid-19 crisis level at the beginning of the year (Figure 14). The narrowing of the spreads is attributed to an increase in investors' risk appetite in response to the sharp decline in government bond yields, and to corporate bonds purchases by major central banks.

The corporate yield spread over government bonds (on average, 97 basis points in the dollar-denominated market and 120 basis points in the Eurozone), and benefiting from the opportunities that were created when the spreads widened in response to the crisis, led to the corporate bonds' positive contribution.

Figure 14
The Spread between Corporate Bonds and Government Bonds in the US 0–5 Year Benchmark and the Europe 1–5 Year Benchmark, 2019–2020



Source: Bloomberg.

Since the beginning of the crisis, the bonds of 24 issuers in the corporate bond portfolios dropped below investment grade. In total they comprised 0.1 percent of the reserves portfolio and most were sold by the end of the year. The market value of these downgraded corporate

bonds constituted 1.3 percent of the value of the corporate bond portfolio, which was lower than their proportion in the benchmarks (2.2 percent).

3. Duration and diversification (152 basis points)

The duration of a fixed-income portfolio is an accepted measure for measuring the portfolio's interest risk. The contribution of duration and asset diversification is a function of the decision to invest the reserves at a duration that differs from that of the basic benchmark, and the decision to disperse the assets differently along the curve compared with the basic benchmark. A portfolio with a longer duration usually benefits from a higher interest return than that of the basic benchmark and generates capital gains when yields drop, but increases the portfolio's volatility and leads to capital losses when yields rise. The Monetary Committee decided at the beginning of the year to retain the duration of the portfolio at 24.6 months, the same level as the previous year.

The contribution of duration and diversification this year was 152 basis points. The high contribution for this component compared with the past stemmed mainly from the sharp decline in yields during the crisis. This year, the portfolio's duration averaged 22.9 months, compared with the duration of the basic benchmark, which was 6 months. This year, as a result of the Covid-19 crisis, yield curves of the dollar and pound sterling recorded declines and the yield curve of the euro flattened (Figure 9). Most of the contribution (138 basis points) derived mainly from the decline in the yield of the dollar curve. The euro portfolio made a positive contribution (13 basis points), despite the negative yield to maturity along most of the curve.

4. Currency risks (11 basis points)

Currency exposures are risks due to investment in currencies that are not included in the composition of the numeraire. In early 2020, the Monetary Committee increased the investment in the currency basket by 1.2%, to 3%, to mitigate the effects of the negative yields in Europe. At the same time, investments were expanded in six currencies in the currency basket: equally weighted investments in Czech Republic, Norway, Chile, China, Poland, and the United States against the euro.

Currency risks made a negative contribution of 11 basis points. The main portion of the loss stemmed from the investment in the currency basket. The investment in the currency basket was made against the euro, and the loss was recorded as a result of the currencies' weakening against the euro, which was partially offset by positive interest rate differentials (carry).

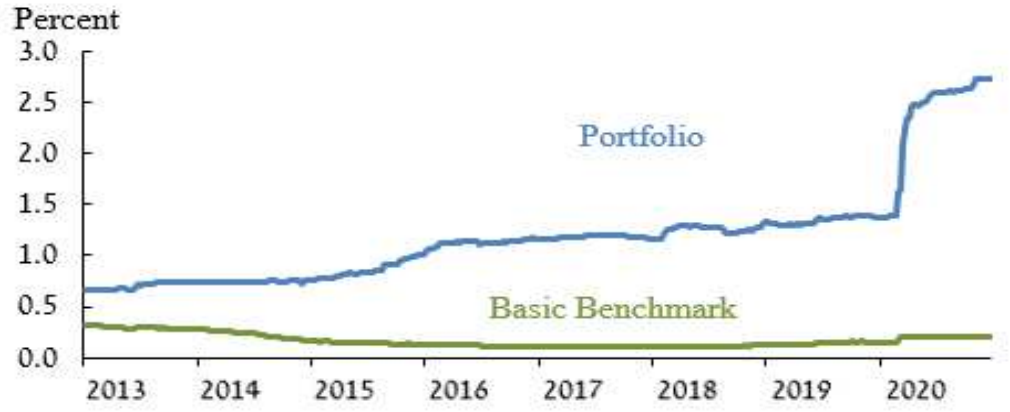
E. Measures of Risk and Risk-Adjusted Returns

1. Volatility of the reserves portfolio, active management, and the $CVaR_{5\%}$ measure

The risk in the reserves portfolio increased in recent years due to the increased share of risk assets as part of the active management. The volatility in financial markets in 2020 was higher than in the previous year due to the Covid-19 crisis, and approached the levels recorded during the financial crisis in 2008. The reserves portfolio's risk is derived mostly from the contribution of active management, while the risk of the basic benchmark is low and stable (Figure 15).

As a result of these background factors, the volatility of the reserves portfolio peaked in 2020. The standard deviation of the portfolio's return, which measures this volatility, was 3.35 percent, while the basic benchmark's volatility remained relatively low (0.25 percent) as in preceding years, as expected from its conservative asset composition (Table 4).

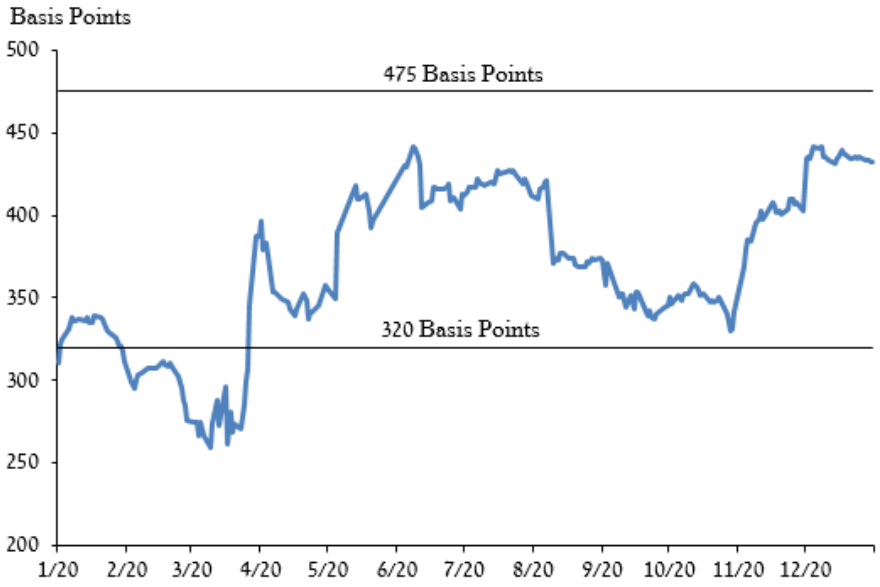
Figure 15
Standard Deviation of the Reserves Portfolio and the Basic Benchmark[1], 2013–2020



[1]Standard deviations of weekly returns in annual terms, moving avarage triennial
Source: Bank Of Israel

In its guidelines, the Monetary Committee established the maximum risk level of the reserves for a one-year horizon, in terms of $CVaR_{5\%}$. The maximum permitted $CVaR_{5\%}$ is 475 basis points, which means that given the worst 5 percent of possible outcomes, the average loss—the CVaR5%—would not be greater than 475 basis points over a one-year horizon. In addition to determining the maximum level of this measure, at the beginning of each year the Monetary Committee determines the risk level (in terms of the $CVaR_{5\%}$) to be used for setting the strategic allocation for that year, based on the Committee's forecasts for macroeconomic and financial background conditions. For the strategic allocation for 2020, the Committee set a risk level of 320 basis points. The risk level of the portfolio is affected both by the volatility of the financial assets and the portion of the risk assets in the portfolio, and is subject to regular monitoring and review over the course of the year. As a result of the Covid-19 crisis, the volatility of the financial assets increased notably, reflecting the riskiness of the assets. The increased volatility caused an increase in portfolio risk levels, and **in 2020 the $CVaR_{5\%}$ measure exceeded the level that was set at the beginning of the year, yet remained within the boundaries of the guidelines** (Figure 16).

Figure 16
CVaR 5% Measure of the Reserve Portfolio, 2020



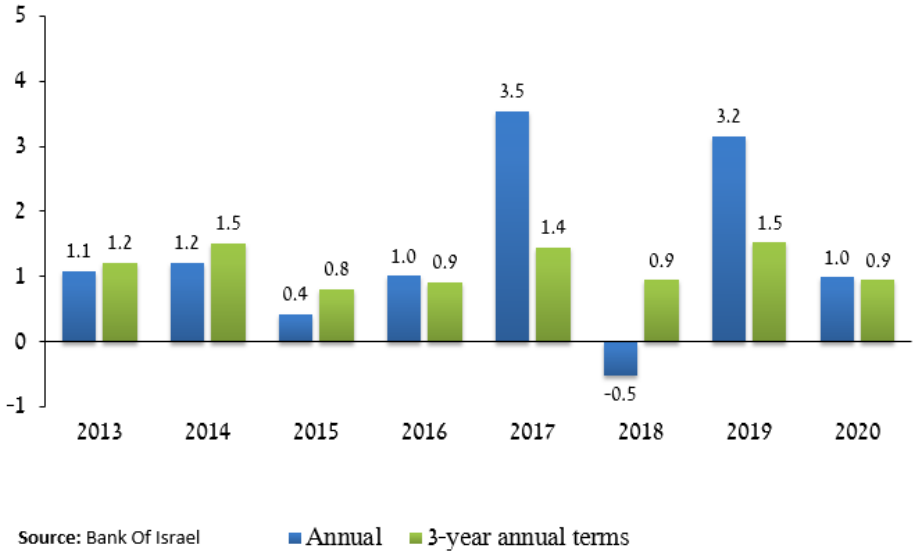
Source: Bank of Israel, data from Aladdin

2. The risk-adjusted contribution of active management

The **Information Ratio (IR)** measures the **active management** of the portfolio manager (the excess returns) for the excess risk assumed, and indicates the degree of consistency in the manager's ability to generate excess returns at higher levels of risk. The index is calculated as the ratio of the contribution of active management to its standard deviation.

Despite the high returns recorded this year, the risk-adjusted return, measured by the IR, declined sharply due to the high increase in the volatility of active management (Figure 17). When measured over 3 years, the risk-adjusted return is much less volatile.

Figure 17
The Ratio of Active Management Contribution to its Standard Deviation (Information Ratio), annual and 3-year measurement, 2013–2020



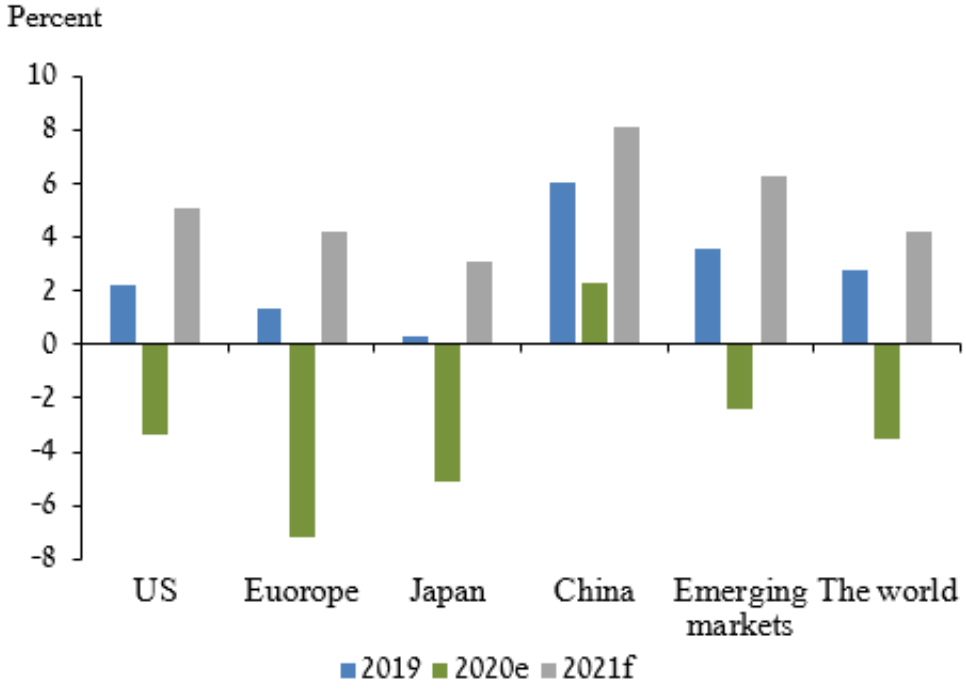
Source: Bank Of Israel

Appendices

Appendix 1
The Global Economic and Financial Environment

In early 2020, the global economy was characterized by optimism and a positive momentum against the backdrop of positive developments in the trade war. While the IMF lowered its growth forecasts, it pointed to initial indications of stabilization of economic activity. However, the Covid-19 virus, which erupted in China and became a global pandemic in the end of the first quarter of the year, led to a sharp turnaround and unprecedented recession in economic activity. The spread of the pandemic led many countries to impose social distancing measures in efforts to control the pandemic, and these steps halted economic activity and created a deep recession. According to recent estimates, global GDP contracted by 3.5 percent[8] in 2020, which affected all major economies with the exception of China (Figure A-1).

Figure A.1
Annual Growth by Major Countries/Blocs



Source: IMF. 2019 Actual data, 2020 Estimated Data, 2021 Forecast

These adverse effects led governments and central banks to take unprecedented measures to support their economies and prevent a massive collapse of businesses. Measures mainly included support and aid for the unemployed and employment grants, loans and grants to businesses, and transfers to the health system. Several countries also instituted direct transfers to residents. These measures led to a significant increase in deficits and to a sharp rise in debt-to-GDP, which reached

[8] Basic growth figures are based on the World Economic Outlook Update, January 2021, by the IMF.

its highest level since WWII and potential has long-term implications for global fiscal policy and growth.

Extraordinary measures were also taken on the monetary front. Central banks lowered interest rates in some cases and at unscheduled meetings, and clarified that interest rates would remain low in the future (Figure A-2). Many central banks also employed diverse instruments to support their economies including quantitative easing, yield-curve control programs, temporary financing of government debt, easing of capital requirements of commercial banks; credit programs, guarantees and liquidity in foreign currency. These steps led to a decline in bond yields across the curve (Figure A-3) and a tightening of corporate bond spreads. These developments increased risk assets' attractiveness, and despite the sharp declines in equities markets that occurred at the outbreak of the pandemic, the MSCI (World) index gained more than 14% this year (Figure A-4).

Figure A-2
Monetary Interest Rates Development
(dashed lines—futures indication at the end of 2019)

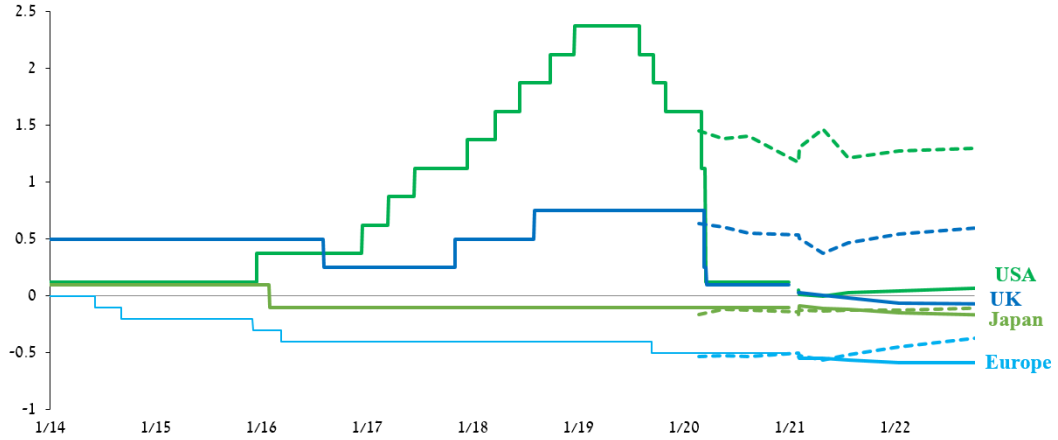
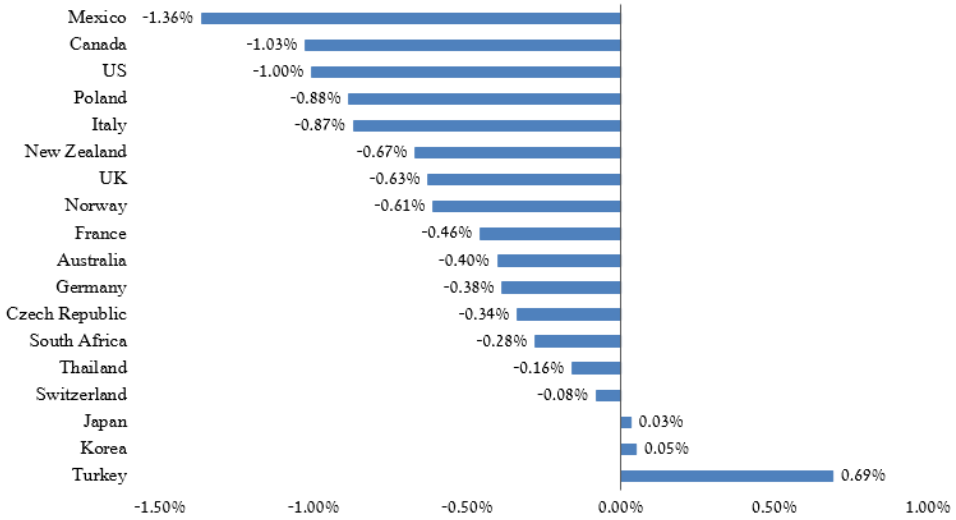
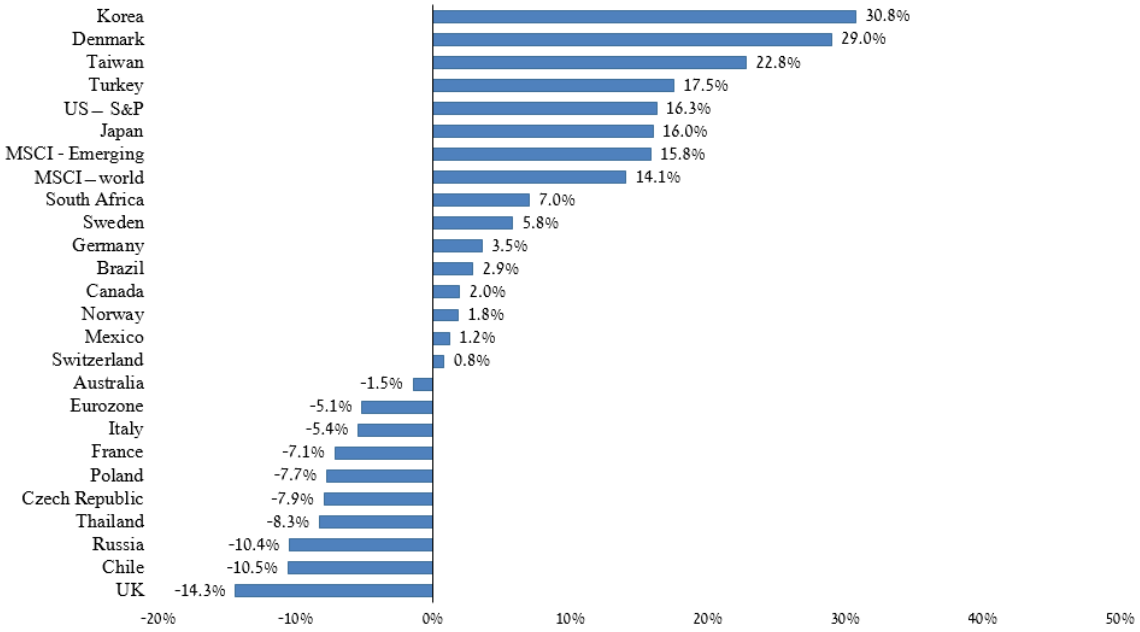


Figure A-3
Change in Yield to Maturity on 10-Year Bonds in Major Economies in 2020



Source: Bloomberg

Figure A-4
Equity Returns in Local Currency Terms, 2020



Source: Bloomberg

The United States was extremely hard hit by the pandemic, which led to a downturn in economic activity, a significant rise in unemployment, and a decline in labor force participation. However, a relatively moderate lockdown policy and strong fiscal support, caused the pandemic's adverse effects on the economy to be less severe compared to European countries. GDP contracted this year by 3.4 percent, with weakness peaking in the second quarter of the year, while a genuine improvement in economic activity occurred in the second half of the year. At the beginning of the pandemic, in two unscheduled meetings the Fed reduced interest rates by a total of 150 basis points to 0–0.25 percent within two weeks, which, alongside expansionary measures that included purchases of treasury bonds, and expectations of continued expansionary monetary policy, led to a sharp drop in treasury bond yields to near-zero rates (Figure A-5). The diminishing interest rate differentials between the US and Europe and fiscal measures that increased the deficit, supported a weakening dollar (Figure A-6), which traded at its lowest since early 2018.

In the **eurozone**, GDP fell in 2020 by 7.2 percent, compared to a growth rate of 1.3 percent in 2019. In southern Europe, GDP feel more significantly than the continent as a whole, mainly due to the pandemic's more severe outbreak and the relatively high weight of tourism in economic activity in those countries. Contraction of economic activity led the ECB to increase its quantitative easing program and clarify that its monetary policy would remain significantly expansionary over time. The European Council of the ECB also launched a eurozone-wide fiscal program to mitigate the pandemic's effects. Economic contraction also led to a significant decline in inflation, which grew farther from the ECB's target.

The **UK economy** fell by 10 percent this year against the backdrop of a severe outbreak of the pandemic and a relatively large adversely affected service sector. Accordingly, and in view of the uncertainty concerning the trade agreement with the EU, equities markets also weakened and fell by 14 percent this year. At the outbreak of the pandemic, the Bank of England lowered the interest

rate by 60 basis points to 0.1%, promoted a quantitative easing program, reduced regulatory burdens, and provided extensive support to the banking and corporate sectors. The government also instituted supportive fiscal measures. Toward the end of the year, the UK and the EU reached a trade agreement that prevented a "hard Brexit."

Figure A-5
US Government Bond Yield for 10 Years and for 2 Years, and the Slope of the Curve

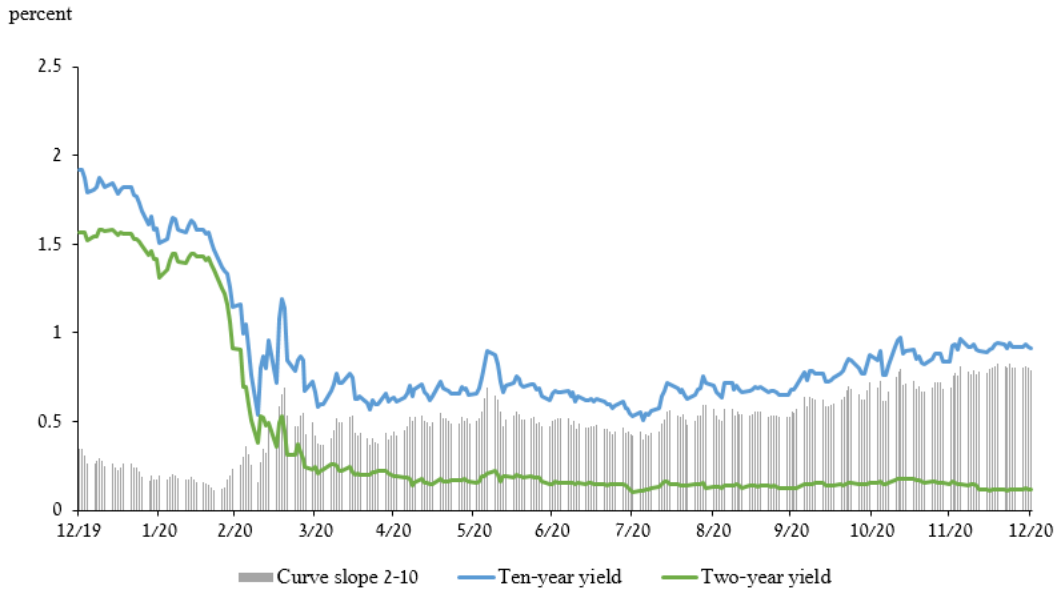
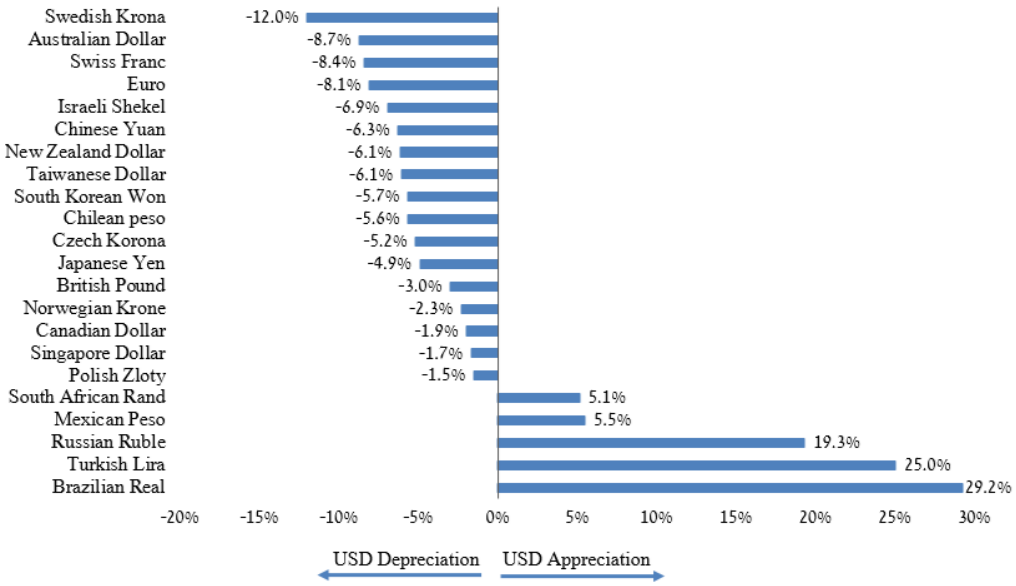


Figure A-6
Performance of Major Currencies vs. the Dollar, 2020



In 2020, the **Japanese economy** shrunk by 5.1 percent compared with a low growth rate of 0.3 percent in 2019. IMF predicted a growth rate of 3.1 percent in 2021. The Central Japanese Bank retained its interest rate (0.1 percent) and yield-curve control program unchanged, but doubled its purchase plans of ETFs and REITs. The Central Bank also established a loan program to support small businesses and increased its purchase plan of commercial paper and corporate bonds. The

Japanese government announced a fiscal program that included subsidies to support tourism and preserve employment, and granted economic incentives to increase digital innovation and reduce air pollution. As a result of the relatively effective handling of the pandemic and the yen's status as a safe-haven currency, the yen gained 5 percent against the dollar this year.

China, the original site of the pandemic's outbreak, recorded a swift V-shaped recovery, and was the single G-20 country that is expected to record growth in 2020 (app. 2.3 percent). Initially, China's recovery was based mainly on government demand and infrastructure investments, but subsequently was also based on export of medical equipment and an increase in domestic demand. China's rapid growth is expected to continue in 2021 as well (8.1 percent according to IMF forecasts). Although concerns of an economic hard landing in China have not disappeared, the probability of this scenario appears to be small for the time being.

Appendix 2
Foreign Exchange Reserves: Investment Policy Guidelines

Foreign Exchange Reserves: Investment Policy Guidelines[9]

In effect from January 23, 2019

In accordance with Section 40(b) of the Bank of Israel Law, 5770-2010, the Monetary Committee is to establish the guidelines for the investment policy of the foreign exchange reserves.

1. **Basic guidelines derived from the goals of holding the reserves**
   The investment policy of the reserves portfolio is based on the main goal of achieving the Bank of Israel's objectives and proper fulfillment of its functions as they are detailed in the Bank of Israel Law. Subject to that, the investment policy is also based on the following goals:

   a) **Maintaining the purchasing power of the reserves:** This principle is interpreted as preserving the value of the reserves in terms of measurement currency chosen by the Bank—the numeraire (see 3 below).
   b) **Managing the reserves with a high level of liquidity:** A large part of the reserves are to be invested in assets that can be liquidated rapidly at short notice and without negatively impacting their value. The precise level of liquidity is to be increased to the extent that the actual level of reserves relative to the desired level is low (5(e) below).
   c) **Achieving an appropriate return on the reserves portfolio,** at an acceptable level of risk, to the extent that it does not negatively impact the achievement of the previous goals (see 4 below).

The investment strategy of the reserves portfolio shall be formulated with weight given to the risk profile and to the portfolio's return in the short term and the medium term, subject to compliance with the safety and liquidity limitations at any given moment.

2. **The division of work between the Monetary Committee, the Foreign Currency Committee, and the Markets Department**

In implementing Section 40(b) of the Bank of Israel Law, the Committee made a distinction between establishing the guidelines and periodic monitoring, and setting the detailed instructions for the day to day management of the portfolio.

The Monetary Committee will set the guidelines, in consultation with the Minister of Finance as established by law, will update the guidelines to the extent necessary, and will monitor the implementation of the investment policy by the Markets Department.

The Markets Department will implement the investment policy, within the framework of degrees of freedom which will be set periodically by the Monetary Committee, and will report to the Monetary Committee on a quarterly basis on the implementation of the policy: developments in international markets and their impact on the management of the reserves, the investment

[9] The characteristics of the reserves portfolio are reported to the public in an annual report published on the Bank of Israel website.

decisions reached by the Department, the portfolio's rate of return, and the financial and other risks to which the portfolio is exposed.

The Markets Department will advise the Monetary Committee on fulfilling its functions, through position papers and suggestions for discussion in the Committee.

The Monetary Committee will approve and update periodically the division of authorities regarding the investment policy of the foreign exchange reserves.

3. The measurement currency for the holding rate of return on the foreign exchange reserves and the principles for its determination

The measurement currency for the holding rate of return on the reserves—hereinafter, the numeraire—is a basket of currencies and its composition allocation[10] is decided by the Monetary Committee. The allocation of the numeraire is set according to principles that reflect the goals of holding the reserves.

The principles according to which the composition of the numeraire is set are:

a) The currency composition of actual imports, and of imports expected in an emergency situation
b) The composition of the short and medium term external debt
c) Assessments regarding the liquidity of the various currencies in which investment is possible.

The composition of the numeraire is also examined from the perspective of the currency composition of foreign exchange reserves portfolios of all central banks of countries that are IMF members, as reported by the IMF.

The composition of the numeraire will be set at the end of each year by the Monetary Committee, on the basis of the Markets Department's recommendation, in accordance with changes in domestic and global market conditions. If there are significant changes in one or more of principles (a)–(c), the composition of the numeraire will be brought to discussion by the Monetary Committee.

[10] The numeraire is defined in terms of units of currency (i.e., X dollars, Y euro, and Z pound sterling). The ratio between the currency units (in the above example, X:Y:Z) is determined by the currency composition of the portfolio (in the above example, % of dollars in the portfolio, % euro, and % pound sterling), which is set by the Committee and the exchange rates of the numeraire currencies at the time of the decision.

The reserves portfolio holding rate of return is measured in terms of the numeraire, so that the currency basket which makes up the numeraire is seen by the reserves portfolio managers as a risk-free currency composition.

4. The risk profile

The risk profile determines the maximum level of risk that the Monetary Committee is willing to accept in order to achieve the goals of holding the reserves. In establishing the risk profile, scenario analysis and a range of analytical tools to measure risk, such as VaR, CVaR, and others should be used. The risk profile is to be set by the Committee on a periodic basis in accordance with the changing conditions in the global capital markets.

The risk profile will be set so that given the worst 5 percent of outcomes, the average loss will not be greater than 475 basis points over a 1-year horizon. The risk level was established with the goal of limiting risk in the short term and increasing the probability of complying with the target of maintaining the purchasing power in the medium term.

5. The rules for managing the financial risks of the reserves

The rules for managing the financial risks to which the reserves are exposed, and their asset allocation, are to be set in accordance with the goals of the investment policy of the reserves (Section 1 above) and subject to the risk profile set by the Monetary Committee (Section 4). The asset allocation of the foreign exchange reserves will be approved at least once a year by the Monetary Committee.

a) The types of assets approved for use in managing the reserves are:

1. Bonds (including bonds with fixed interest, with variable interest, and CPI-indexed bonds)
2. Mortgage-backed securities (MBS) and asset-backed securities (ABS), a maximum of 6 percent of total reserves
3. Tradable Certificates of Deposit (CDs)
4. Fixed term deposits
5. Commercial Paper (CP)
6. Equities, a maximum of 17.5 percent of total reserves
7. Derivatives whose underlying asset is permitted for investment.

b) Management against a benchmark

Control over most features of the financial risk of the reserves is anchored in their management against a system of benchmarks. The rules for managing the financial risks of the reserves generate the currency allocation of the benchmarks, the features of their price risk (such as duration) in each currency, and the asset types included in it. The investment returns of the portfolio managers are measured against these benchmarks.

c) Currency risk:
The currency exposure of the reserves is set by:

1) The composition of the numeraire.
2) Strategic currency exposures relative to the composition of the numeraire: The extent of the strategic currency exposures is limited to 10 percent of total reserves. The composition and amounts of the exposures will be set by the Monetary Committee.
3) Short and medium term currency exposures relative to the composition of the numeraire: Their amount is limited to 2 percent of the total reserves. The composition and amounts of the exposures will be set by the Markets Department.

d) Credit risk:
In order to limit the credit risk inherent in day-to-day management of the reserves portfolio, the Monetary Committee set the following rules:

1. Investment is permitted in the currency of countries whose major credit rating category is at least BBB. Investment in currencies of countries whose credit rating category is BBB is limited to 1 percent of the total reserves and requires the specific authorization of the Monetary Committee.
2. Investment is permitted in bonds and commercial paper issued by governments, or with government guarantees, if their major credit rating category is at least a BBB rating. Investment in the BBB major rating category is limited to 1 percent of total reserves, and requires the specific authorization of the Monetary Committee.
3. Investment in bonds of public sector entities (PSE) is limited to a maximum of 15 percent of total reserves, and only in bonds whose major credit rating category is at least A.
4. Investment in corporate bonds is limited to 15 percent of total reserves, and only in bonds whose major credit rating category is at least BBB.
5. Investment in bonds and deposits of international financial institutions is limited to 15 percent of the reserves.
6. The exposure of the reserves to the banking system should not be greater than 10 percent of total reserves, and that is only to banks and brokers whose major credit rating category is at least A. Activity with banks and brokers whose major credit rating category is BBB is limited to DVP[11] (delivery versus payment) alone.

[11] DVP activity is when the payment and the asset are transferred between the sides at the same time and thus the credit risk in such activity is essentially zero.

e) *Liquidity risk:*
In order to provide an immediate response to the financial problems which arise during emergencies, a large portion of the reserves should be invested in assets that can be liquidated in large amounts at short notice and without negatively impacting their realization value.

1. The assets in which the reserves are invested are classified into 3 levels of liquidity:
    a. Highly liquid assets that can be realized within a month without negatively impacting their realization value.
    b. Assets that can be realized within three months without negatively impacting their realization value.
    c. Low-liquidity assets that can be realized in a period exceeding three months without negatively impacting their realization value.

2. A minimum level of investment was set for highly liquid assets, and a maximum level was set for low-liquidity assets. Classification of assets into the various liquidity levels can change due to changes in market conditions.

3. At least 45 percent of the total reserves are to be invested in government bonds.

f) Active management and compliance rules:
The reserves portfolio is actively managed within the framework of limited and well defined degrees of freedom, as long as the investment policy adheres to the guidelines.

g) Risk assets:
Total combined investment in equities (Section 5.a.6) and in corporate bonds (Section 5.d.4) shall not exceed 25 percent of the total reserves.

6. The nonfinancial risks inherent in managing the reserves

In determining the investment policy for the reserves, there must be taken into account the exposure of the Bank and of the portfolio to the various nonfinancial risks inherent in investing the reserves—reputation risk, legal risk, political risk, operational risk, and so forth.

7. Measuring returns and reporting them

The reserves are managed with transparency. The Markets Department shall report periodically to the Monetary Committee (see 2 above) on the amount of the reserves and changes in them, the currency composition, changes in currency exposures, the asset allocation, portfolio duration, country exposure, credit risk, liquidity risk, and the return on the portfolio and its various components. The report should include an analysis of the current developments in the financial markets and their effect on the management of the reserves.

8. Handling passive breaches

The Monetary Committee will set the rules for handling passive breaches from the investment policy guidelines.

Appendix 3
Glossary

1	Active management	An investment management style in which the portfolio manager tries to achieve a return greater than that of a benchmark or market index by deciding to buy or sell securities or by various investment strategies. In this report, the term describes the contributions of decisions to invest in additional assets and countries that are not included in the basic benchmark.
2	Basic benchmark (numeraire-composition benchmark)	Represents an asset composition that is conservative and investable, which meets the first two objectives of the reserves' investment policy—maintaining the purchasing power of the reserves and managing them with a high degree of liquidity. Its currency composition is identical to the numeraire composition. It includes short-term government bonds in the numeraire currencies.
3	Basis point	0.01 percent; one ten-thousandth, or one hundredth of a percentage point.
4	Benchmark portfolio	A hypothetical investable portfolio constructed according to agreed-upon rules, which is used as a yardstick for evaluating the performance of an investment portfolio manager and as an anchor for the portfolio risk management.
5	CVaRp (Conditional Value at Risk)	The risk index that is used to quantify the level of risk, in terms of the expected loss on the investment portfolio in a specific time period and given a certain probability (p). In the guidelines, the Monetary Committee set the maximum level of risk for the reserves, so that given the worst 5 percent of possible outcomes, the average loss—the CVaR5%—would not be greater than 475 basis points over a one-year horizon.
6	Contribution of active management (excess return)	The difference between the return on the reserves portfolio and the return on the basic benchmark, which measures the decisions to invest in additional assets and countries that are not included in the basic benchmark. Also termed "excess return".
7	Credit risk	The exposure to the possibility of loss due to failure of timely payment on debt, whether of an issuer, a financial institution or a country, or as a result of changes in the market's evaluation of the probability of such an event.
8	Currency risk	The exposure to the possibility of a loss as a result of a change in exchange rates.

9	Foreign exchange reserves	Financial assets that are issued by foreign entities and which are denominated in a foreign currency (including gold). They are exclusively owned and managed by a central bank and are not pledged in any way.
10	Holding rate of return	Rate of change in the value of an asset or portfolio, including interest or dividends, over a defined period.
11	Information Ratio	The Information Ratio measures the active management of the portfolio manager relative to the risk taken, and indicates the degree of consistency in the manager's ability to generate excess returns on additional risk. The risk is calculated as the ratio of the contribution of active management to its standard deviation.
12	Interest rate risk	The exposure to the possibility of a loss as a result of an increase in the yield to maturity.
13	Investment policy guidelines	The investment policy guidelines include details on the assets, risk profile, and quantitative and qualitative limitations on the types of assets permitted for investment. It should be emphasized that the limitations on the various asset types are not a recommendation for the actual share of investment in those asset types.
14	Liquidity risk	The exposure to a potential loss resulting from the compulsory liquidation of assets in a short period of time and at a larger volume than what the market is able to handle without a negative impact on the market price and/or the buy/sell spread.
15	Market risk	The exposure to a potential loss resulting from changes in asset prices. The market risk of bonds combines the interest rate risk and credit risk, if there is any.
16	Monetary Committee	The Monetary Committee was established in accordance with the Bank of Israel Law, 5770-2010. The Committee consists of six members—three from the Bank and three representatives from among the public. The Governor of the Bank of Israel serves as chairperson of the Committee. The Monetary Committee sets the policy for achieving the Bank's objectives, including monetary policy, and decides on the activities that the Bank must take to achieve them. The Committee is charged with outlining the guidelines for the reserves' investment policy, in consultation with the Minister of Finance, and with monitoring the implementation of such policy. The Committee also approves and updates the division of authorities with regard to the reserves' investment policy, between it and the Markets Department.
17	Modified duration	The sensitivity of a small change in the value of a debt instrument, expressed as a percentage of its original value, to the change in the

		yield to maturity (with the opposite sign) of the instrument. Measured in units of time.
18	Numeraire	A currency basket used for measuring the returns on the foreign exchange reserves. See Chapter B, Section 3 above.
19	Portfolio duration	The average duration of a portfolio of fixed income instruments (where the duration of each asset is weighted according to its proportion of the portfolio); a widely accepted measure used to estimate the portfolio's interest rate risk.
20	Risk assets	Assets featuring higher risk than government bonds. In this report, the term refers to equities and corporate bonds.
21	Risk-free portfolio	A portfolio in which the investor is not subject to gains or losses.
22	Risk premium	The excess return of a risk asset over the risk-free interest rate.
23	Spread asset	An asset with a yield to maturity that is greater than that of a government bond with a similar term to maturity, due to differences in exposure to credit risk, liquidity risk, operational factors, etc. The yield spread of this asset is measured as the difference between its yield to maturity and that of a government bond with a similar term to maturity. Spread assets include also government bonds denominated in a currency which is not the local currency of the country of issuance.
24	Standard deviation	A statistical measure used to quantify the dispersion of a distribution around its expected value. Often used as a measure to quantify the exposure to uncertainty. See also volatility.
25	Volatility	The standard deviation (see definition in this glossary) of the distribution of holding rates of return of a financial asset, such as a security or portfolio, over a defined time period (a day, a week, etc.).
26	Yield curve	A curve representing the yields to maturity of bonds with similar characteristics (such as the bonds of a particular country in local currency) and different maturities.
27	Yield spread	The difference between yields to maturity of two debt instruments.
28	Yield to maturity	The holding rate of return, in annual terms, which would be obtained from holding a debt instrument until its final redemption, if it was possible to invest all of its cash flows at the same rate of return until that date. Synonymous term: internal rate of return.